Course Code	Course Title	C	H	I	E	T
17P1CMC2	INORGANIC CHEMISTRY-I	4	4	25	75	100

UNIT I IONIC BOND 12 Hrs

Lattice energy and its determination by Born-Haber cycle and other application of BHC, Born-Lande & Born–Meyer equations, significance of Madelung constant - hardness, electrical conductivity and solubility of ionic compounds - Different types of electrostatic interaction, hydrogen bond. Partial ionic character – resultant of polarization. Fajan's rule – dipole moment determination and its applications.

UNIT II COVALENT BOND –I 12 Hrs

Covalent bond: Qualitative treatment of valence bond & molecular orbital theories- LCAO approximation – symmetry of M.O.'s - Sigma and Pi bonds. Calculation of s and p character – Bent's rule. Bond properties - bond order, bond energy, bond length and bond polarity. Application of MOT to homonuclear (H_2, He_2, Li_2, Be_2, B_2, C_2, N_2, O_2, F_2 and their ions) and heteronuclear diatomic molecule (CH_4, NH_3, H_2O,NO and CO) and triatomic molecules like BeH_2 and CO_2. Walsh diagrams for AB_2 molecule. Comparison of VB & MO theories.

UNIT III COVALENT BOND-II 12 Hrs

Hybridization – various types of hybridization with examples. Delocalization – resonance- VSEPR theory of molecules containing only bond pairs of electrons (BeF_2, BH_3, CH_4, PF_5, SF_6, IF_7 molecules. Geometry of molecules containing both bond pair and lone pairs of electrons ($SnCl_2$, NH_3, H_2O, SF_4, ClF_3, IF_5). Application of VSEPR theory to xenon compounds.

UNIT IV INORGANIC CHAIN, RING AND CLUSTER COMPOUNDS 12 Hrs

Polyacids-isopolyacids and heteropoly acids of vanadium, chrominum, molybodenum and tungsten. Silicates: occurrence and structure of silicates: orthosilicates, pyrosilicates, cyclic silicates, chain silicates, sheet silicates and 3 dimensional silicates. Silicones and applications.
Metal Clusters: Bonding and structures of following clusters:Dinuclear Clusters: Cu(II)carboxylate, Chromium(II)acetate, and $[M_2Cl_8]^{4-}$where M = Mo, and Re
Trinuclear Clusters: $[M_3(CO)_{12}]$ where M = Fe, Ru, Os Tetranuclear Clusters: $[M_4(CO)_{12}]$ where M = Co, Rh, Ir Hexanuclear Clusters: $[Nb_6Cl_{12}]^{2+}$ and $[Mo_6Cl_8]Cl_4$. Poly atomic Zintl ions

UNIT V CAGE COMPOUNDS AND INORGANIC POLYMERS 12 Hrs

The concepts of multicentre bond as applied to electron deficient molecules-boron hydrides-metal alkyls. Preparation, properties and structure of boron hybrides-diborane - carboranes-Metallocarboranes- higher borane, Wade's rules and styx number- boron-nitrogen compounds, borazine, boron nitride. P-N compounds-phosphazenes, polyphosphazenes-polythiazyl, S-N compounds-S_4N_4.

Text Book(s):

1. Gilreeth, E.S., Fundamental concepts of Inorganic Chemistry, Mcgraw Hill, India, 2015.
2. Jolly, W. L., Modern Inorganic Chemistry, Second Edition, Mcgraw Hill, New York,1991.
3. Lee. J.D., Concise Inorganic chemistry, Fifth Edition, Wiley India Pvt, New Delhi,2008.
4. Cotton, F.A., and Wilkinson, Advanced Inorganic Chemistry, John Wiley & Sons Ltd., London-New York, 1972.
5. James Huheey, Inorganic Chemistry, Fourth edition, Harper – Collins, New York, 1993.

Reference Books:

1. Coulson, C. A.,Valence ,Second Edition, Oxford, Clarendon, 1961.
2. Purcell, K.F., Kotz J.C., Saunders W.B., Inorganic chemistry, Saunders College Publishing, Philadelphia, 1980.
3. Emeleus, H.J., and Sharpe, A., Modern Aspects of Inorganic chemistry, Fourth Edition, Routledge and Kegan Paul, United Kingdom, 1975.
4. Day, C., Selbin, J, Theoretical Inorganic Chemistry, Second Edition, Von. Nostrand, 1980.